The Art of MPEG-4 Encoding

Session 705

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Introduction

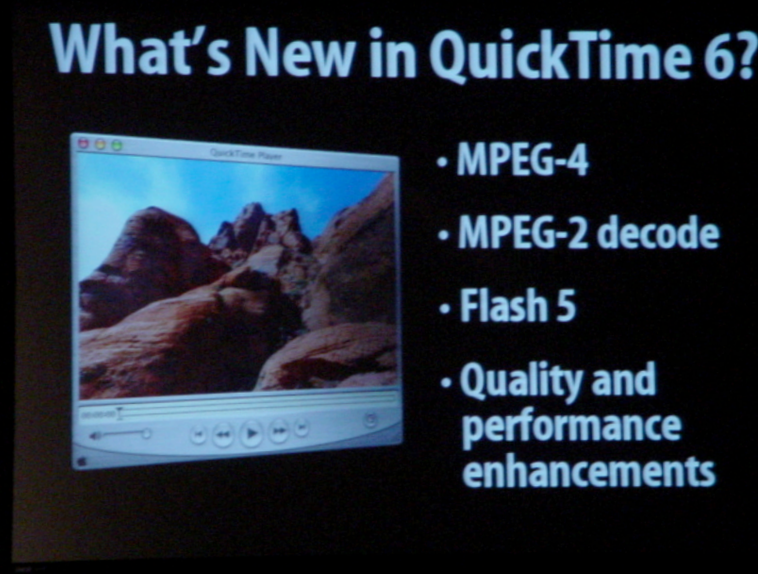
- What is MPEG-4 and what can it do for you?
- Apple calls it
  - "The next-generation global multimedia standard delivering professional-quality audio and video streams over a wide range of bandwidths, from cell phone to broadband and beyond."
- So what does that mean…

What You'll Learn

- A basic understanding of the MPEG-4 specification
  - AAC audio—MPEG-4 Video - ISMA
- How to produce MPEG-4 content
- Discuss ways to deliver MPEG-4 files
- Outline and demonstrate a workflow for creating streaming MPEG-4 content

A Brief History of MPEG-4

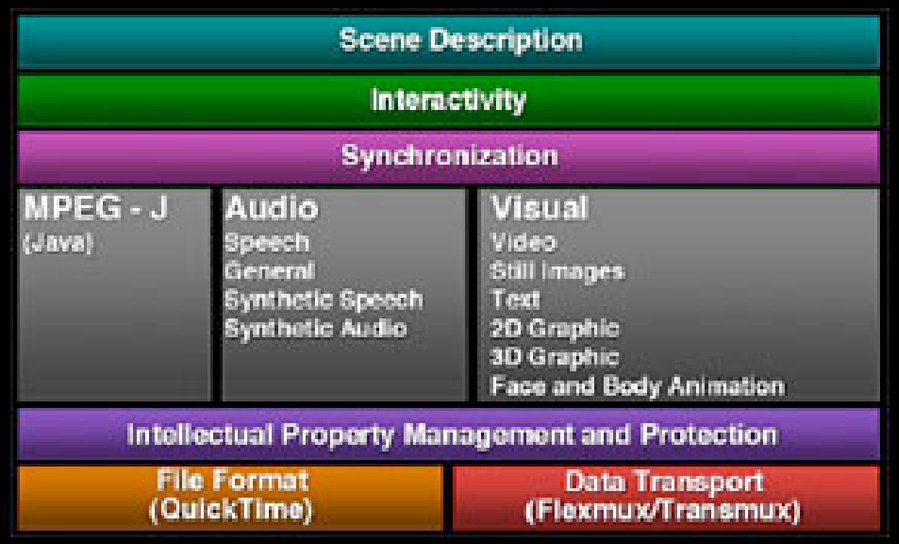
- Approved in 1998 by MPEG as the standard for digital multimedia
- QuickTime 6 with MPEG-4 support announced February 2002
  - AAC Audio
  - MPEG-4 Video
  - 3GPP support
- QuickTime 6 released June 2002



File Format

- A brief history of MPEG-4 part two
  - Based on the QuickTime file format (est 1991)
  - Not just audio and video anymore
    - Sprites
    - Text
    - 2D images
    - 3D objects
    - Digital rights management

QuickTime



MPEG-4

Scalability

A brief history of MPEG-4 part three

- Designed for playback on a variety of devices
- Flexible bitrates
- Multiple frame sizes

Interoperability

A brief history of MPEG-4 part four

- Deliver your content in one format
- Deliver your content to a wide array of platforms
  - Standards-based architecture
    - MPEG
    - ISMA

Who is the ISMA

And why should I care?

- Internet Streaming Media Alliance
- Defines a standard for MPEG-4 streaming and interoperability
  - Members are big-time players
  - Apple
  - AOL/Time Warner
  - Sony
  - Cisco

MPEG-4 Video and AAC Audio

Two great tastes that taste great together

- Video
  - A number of ISO compliant MPEG-4 video codecs: Apple—Sorenson
  - Interoperable: Envivo, Mpegable
- Audio
  - Less processor intensive
  - Multichannel audio support
  - High quality at smaller file sizes

Content Creation and Encoding

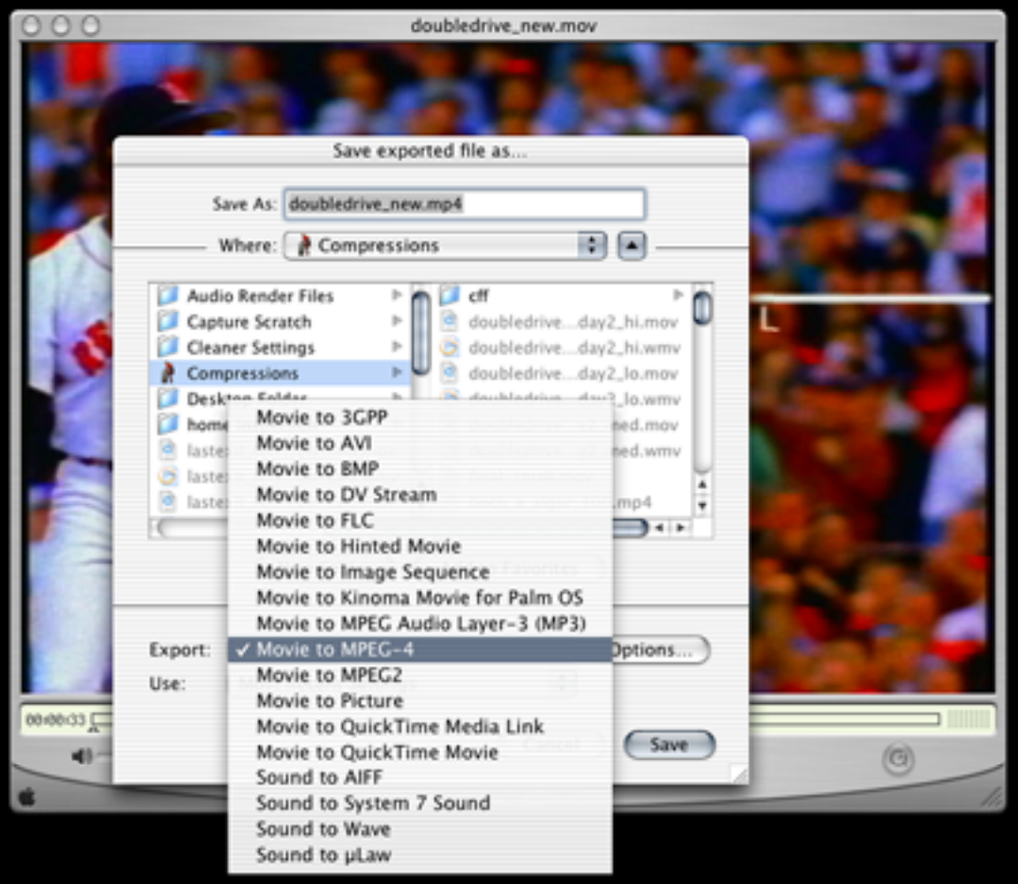
They made it easy for us (kind of)

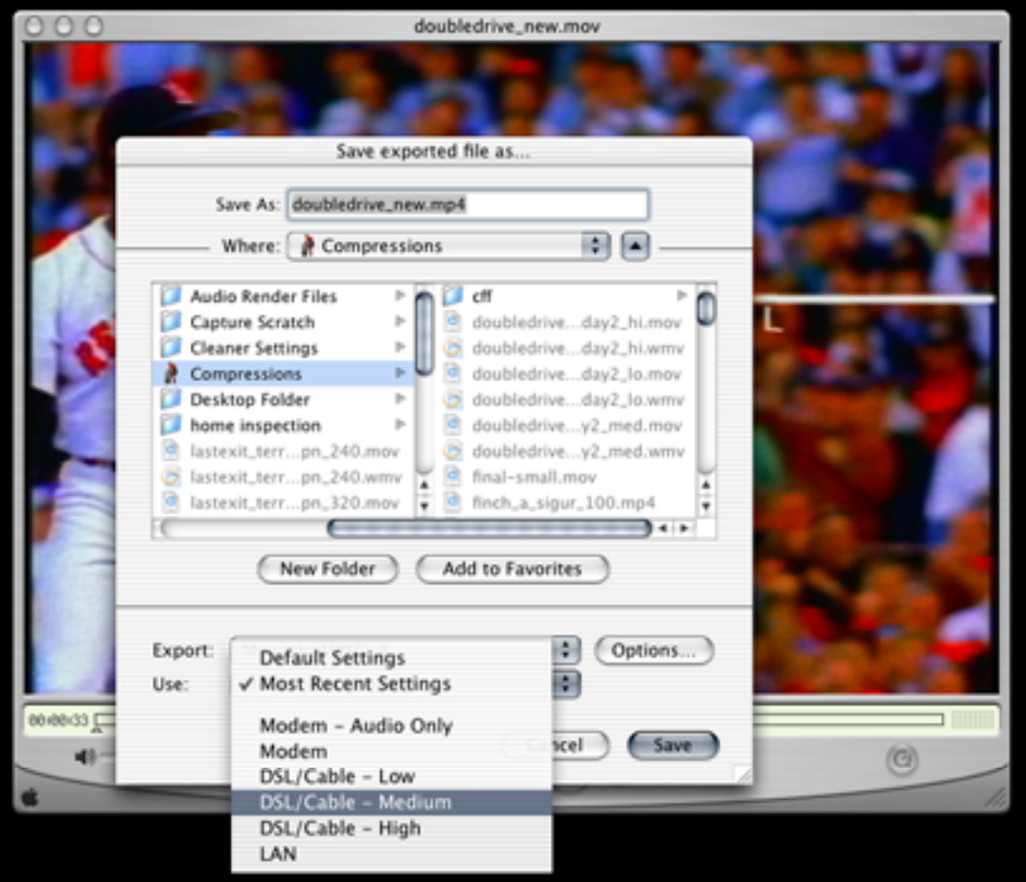
- How simple it can be
- The QuickTime exporter
- Other encoding options

Just Hit “Export”

Pro video encoding for under 30 bucks

- Any QuickTime Pro owner can create an MPEG-4 video





- Command-E (export)
- Choose MPEG-4
- Choose a default setting
- Watch the progress bar

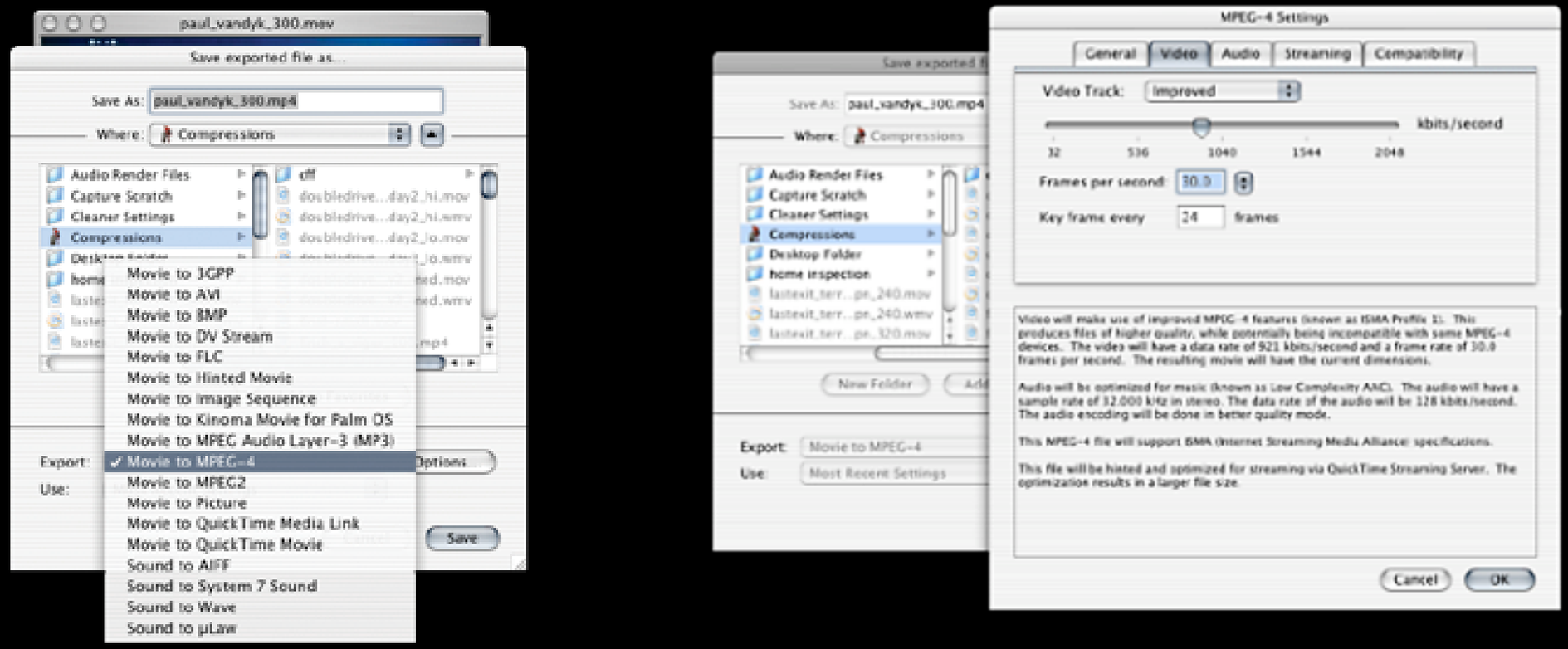
The QuickTime Exporter

Wait a second, I've seen this before

- Every QuickTime savvy application exports the same way
- ISO compliant
- One pass VBR encoding
- Optimized for the G4 processor

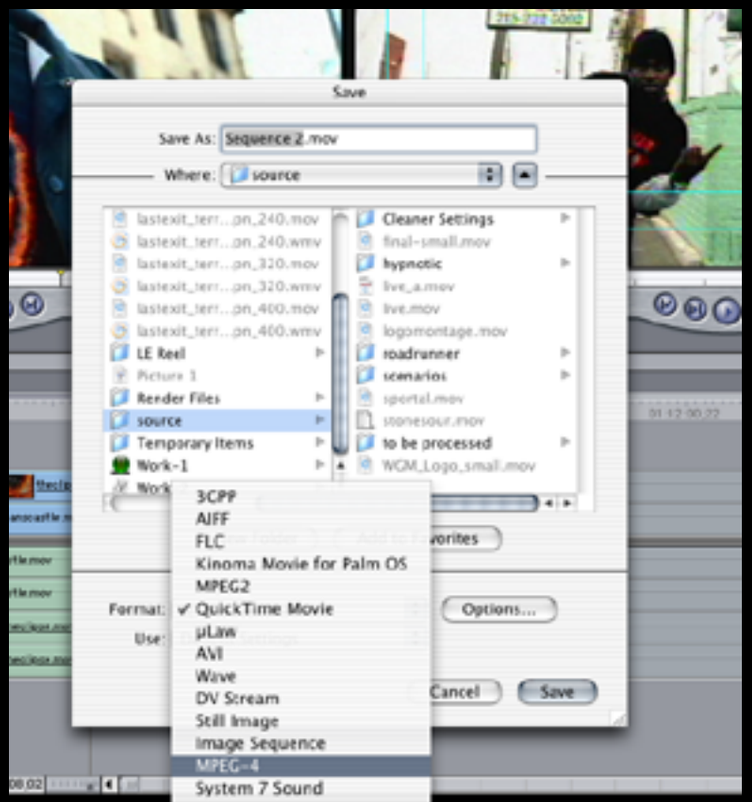
The QuickTime Exporter

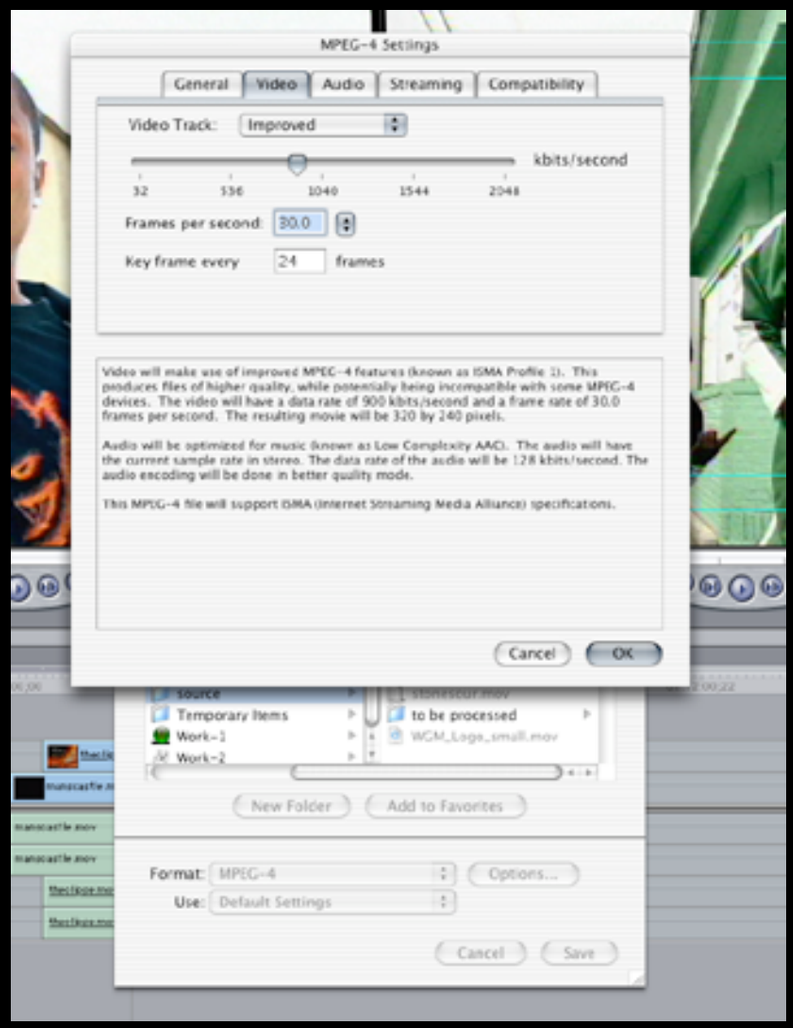
QuickTime 6 player



The QuickTime Exporter

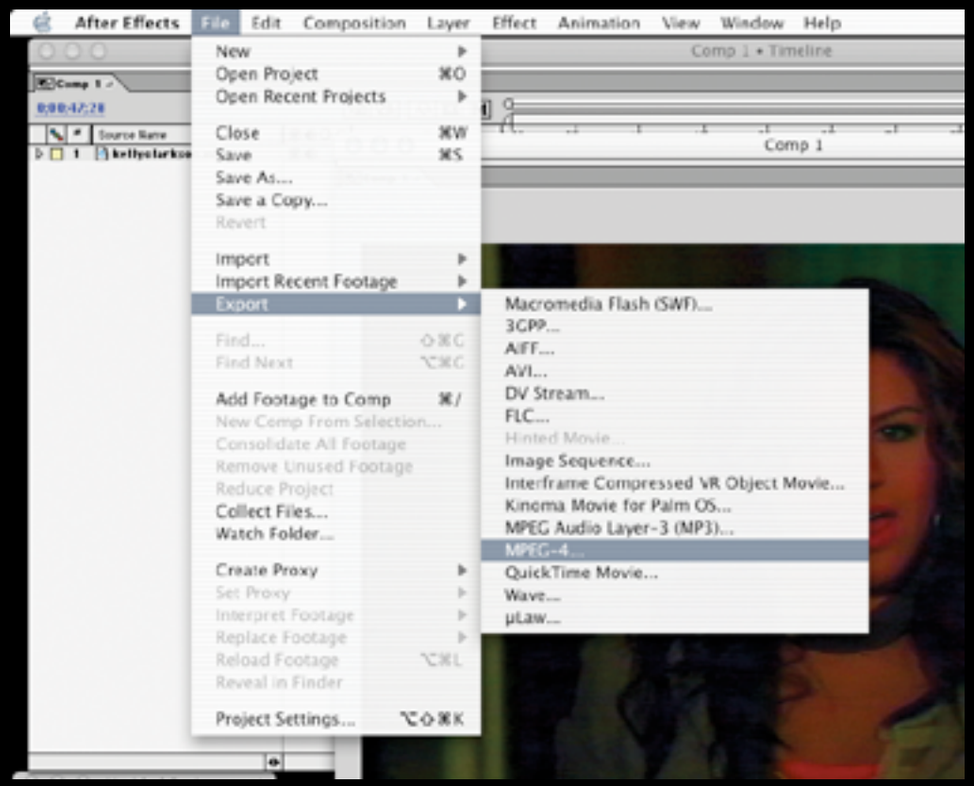
Final Cut Pro 3

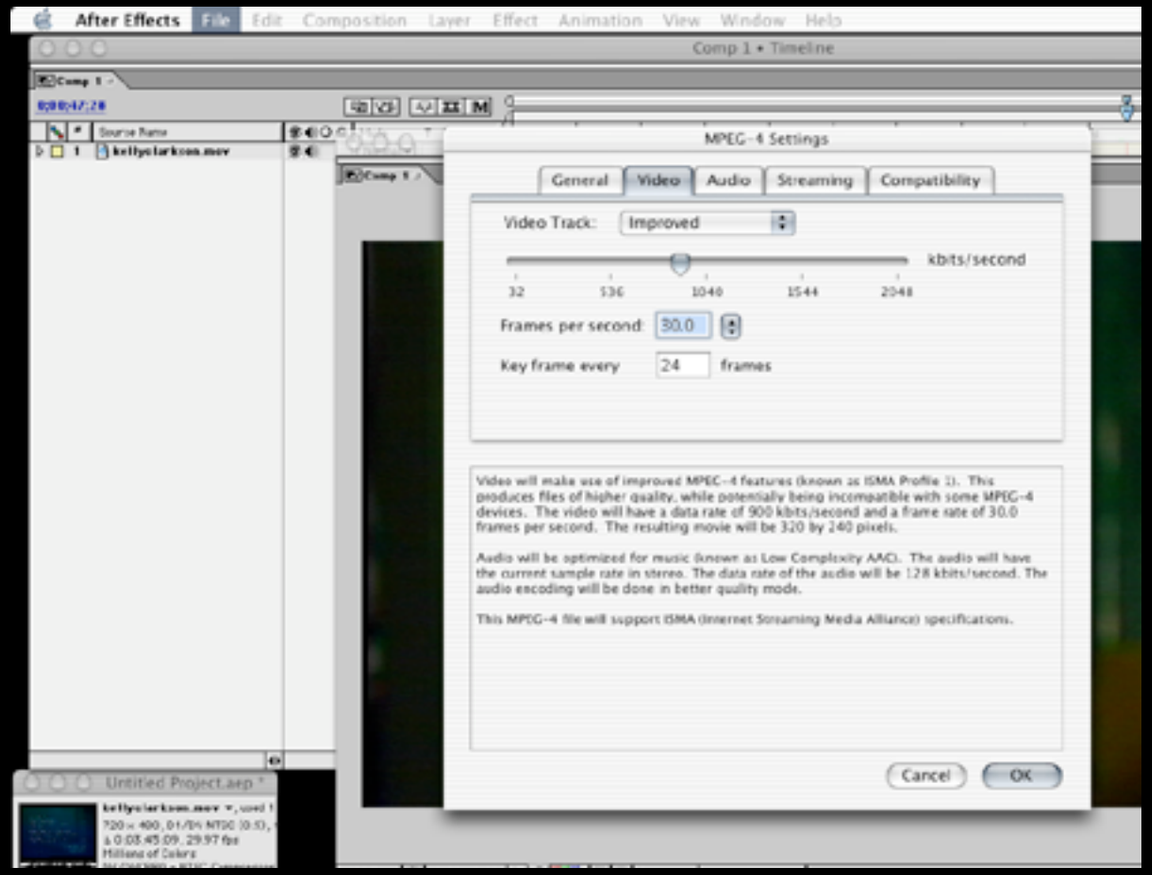




The QuickTime Exporter

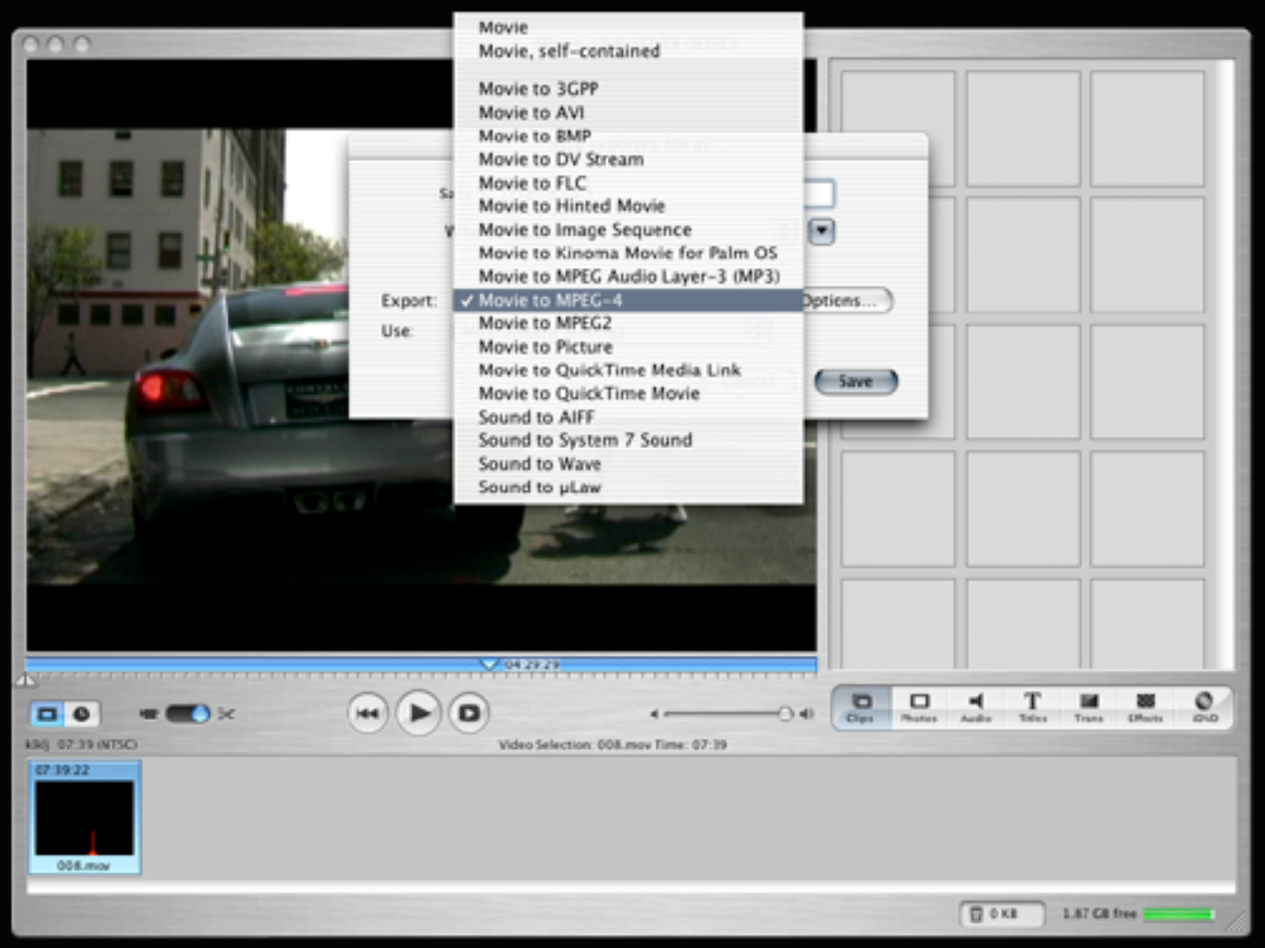
After Effects 5.5





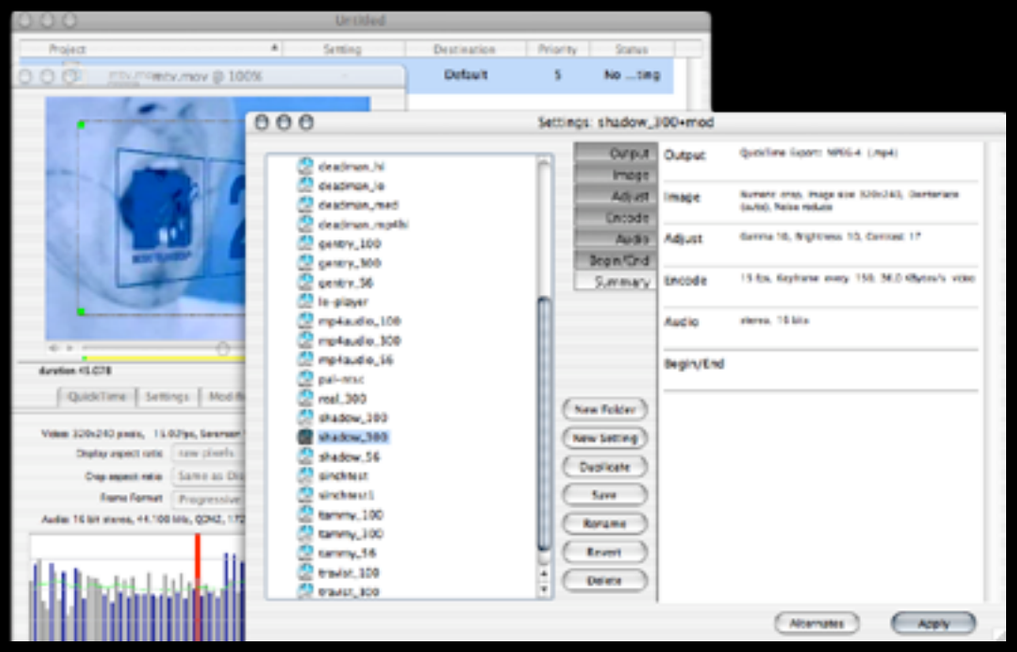
The QuickTime Exporter

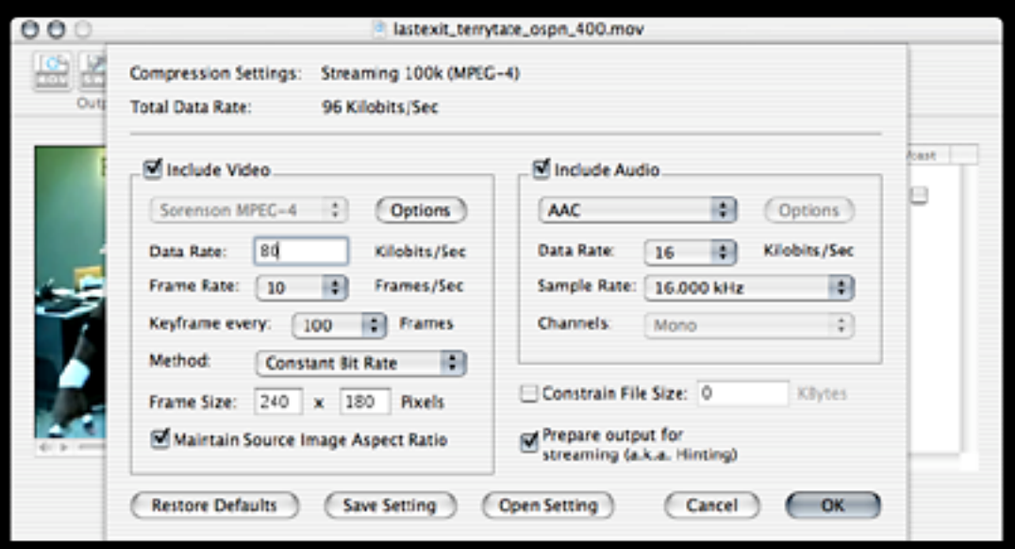
iMovie 3



Cleaner and Squeeze

Control your output





- Cropping
- Color correction
- De-interlacing
- Custom filtering technologies
- Batch processing

Playback and Delivery

When is an MPEG file not an MPEG file?

- Naming conventions and file extensions
  - MPEG-4 video
  - AAC audio
  - 3GPP video
- Pros and cons
- Gotchas

danny_boy_56.mp4

danny_boy_56.mov

danny_boy.m4p

danny_boy.3gp

What's In A Name

Fun with file types

- .mp4 is an MPEG-4 movie
- .mov is still an MPEG-4 movie
- .m4p is also an MPEG-4 movie
- .3gp is an MPEG-4 movie
- What Gives?

danny_boy_56.mp4

danny_boy_56.mov

danny_boy.m4p

danny_boy.3gp

What's In A Name

.mp4

- Native MPEG-4 movie extension
- WIll play back on ISMA compliant devices
- Advantages
  - Interoperability
- Disadvantages
  - Not fast-start
  - Limited annotations

danny_boy_56.mp4

danny_boy_56.mov

danny_boy.m4p

danny_boy.3gp

What's In A Name

.mov

- QuickTime movie extension
- Meant for playback in QuickTime Player or Plugin
- Advantages
  - Fast Start
  - Full QuickTime annotations
  - Can utilize any other QT media types
- Disadvantages
  - Lose interoperability

danny_boy_56.mp4

danny_boy_56.mov

danny_boy.m4p

danny_boy.3gp

What's In A Name

.m4p

- iTunes AAC protected file
- Delivered through the Apple Music Store
- Advantages
  - Digital rights management
  - 128kbps AAC audio
  - Will play in QuickTime, iMovie, iDVD. . . .
- Disadvantages
  - Digital rights management

danny_boy_56.mp4

danny_boy_56.mov

danny_boy.m4p

danny_boy.3gp

What's In A Name

.3gp

- Standard for playback on 3GPP wireless devices
- Video, audio, text implemented under QuickTime
- Advantages
  - Will stream wirelessly to a phone
- Disadvantages
  - Not widely available on the US mobile networks

Demo

Streaming MPEG-4 Workflow

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http://www.lastexit.tv

http://developer.apple.com/wwdc2003/urls.html

Wrap Up

Roadmap—Tuesday

	The Presidio	Pacific Heights	Haight/ Ashbury	SOMA
9:00	701 QuickTime State of the Union			
10:30			702 MPEG-4 Demystified	703 The Pro in QuickTime Pro
12:00				
2:00			704 Introduction to QuickTime Streaming	705 The Art of MPEG-4 Encoding
3:30			706 Designing a Distance Learning Solution With QuickTime	707 QuickTime Media Skins
5:00		708 QuickTime APIs Update	709 QuickTime on Campus— A Case Study	710 Preprocessing Principles

Roadmap—Wednesday

	Russian Hill	Pacific Heights	Haight/ Ashbury	SOMA
9:00	711 Audio and QuickTime		712 QuickTime for the Web	713 Introduction to QuickTime Interactivity
10:30			714 Large-Scale Webcasting: Macworld Keynote Case Study	715 QuickTime Interactivity Tools
12:00				
2:00	716 Advanced QuickTime Programming Techniques		717 3GP: Myth Versus Reality	718 AppleScript and QuickTime
3:30			719 Administering QuickTime Streaming Server	720 Content Creation for Mobile Phones: Top 10 Success Factors
5:00			721 WiFi and 3G: Let the Games Begin	722 Advanced QuickTime Interactivity

Roadmap—Thursday

	The Mission	Haight/ Ashbury	SOMA
9:00		723 The Real Story About MPEG-4 Visual Licensing	724 What's New With QuickTime VR?
10:30		725 QuickTime and Enhanced CDs	726 Cutting-Edge Projects Using QuickTime VR
12:00			
2:00	727 QuickTime Streaming Server Programming	728 Produce a Listening Party With QuickTime	729 Industrial-Strength Encoding
3:30		FF011 QuickTime Feedback Forum	
5:00			

Roadmap—Friday

	Pacific Heights	The Marina
9:00		
10:30	730 QuickTime Alternative Programming Environments	
12:00		
2:00		731 Internet Application Development: The New Frontier
3:30		
5:00		

Who to Contact

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For More Information

For More Information

Documentation

General Information
http://www.apple.com/quicktime

Developer Information
http://developer.apple.com/documentation

QuickTime Information
http://developer.apple.com/QuickTime

QuickTime Developer Series (Morgan Kaufmann)
http://www.mkp.com

Do Not Miss!

Lab: QuickTime Content Creation

Meet with QuickTime content experts for daily content specific topics that are of special interest to you. Bring your own media and PowerBook. No appointment is needed—first-come, first-served.

Sacramento Room

Lab: QuickTime Development

Meet with Apple's QuickTime engineers. Each day will emphasize a specific QuickTime development topic. Bring your own code and PowerBook. No appointment is needed—first-come, first-served.

Sacramento Room

Lab Hours

Monday	12:00pm to 6:00pm
Tuesday	9:00am to 6:00pm
Wednesday	9:00am to 6:00pm
Thursday	9:00am to 4:30pm
Friday	9:00am to 6:00pm

Q&A

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http://developer.apple.com/wwdc2003/urls.html

WWDC 2003

Worldwide Developers Conference